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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/928,584	08/13/2001	Tina Barclay	706015US1	7891

7590

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EXAMINER

DINH, TUAN T

ART UNIT

PAPER NUMBER

2827

DATE MAILED: 03/21/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/928,584

Applicant(s)

BARCLEY, TINA

Examiner

Tuan T Dinh

Art Unit

2827

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 3/4/02 13 August 2001.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) 11-19 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Election/Restrictions*

1. Applicant's election without traverse of Embodiment I (claims 1-10) in Paper No. 4 is acknowledged.

### *Claim Rejections - 35 USC § 103*

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Prior Art (Submitted by Applicant) in view of Linden et al. (U. S. Patent 6,201,701).

As to claims 1-3, 5, PA discloses a circuit board assembly (9) as shown in figure 1 comprising:

- a multiplayer printed circuit board (14);
- a surface mounted ceramic device (28), which is a resistor, having first and second ends (30, 32) with end caps (34, 36);
- first and second electrically conductive pads (42) supporting respective said first and second ends of said device above said printed circuit board, said first and second pads being soldered (49) to said device respective first and second end caps (34, 36);
- and
- a heat sink (10) positioned adjacent said printed circuit board opposite said pads.

PA does not teach a plurality of cylindrical thermal vias deposited into a printed circuit board thermally connecting each pad with a heat sink.

Linden shows a plurality of cylindrical thermal vias (68, column 10, lines 3-6) deposited into said printed circuit board (24, column 4, lines 54-55) thermally connecting each said pad (70, column 10, line 7) with said heat sink (22, column 4, line 54).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use cylindrical thermal via as taught by Linden to employ the assembly of PA in order to enhance heat removal and allow a device mounted on a printed circuit board being operated a lower temperature.

As to claim 4, PA discloses a circuit board assembly as shown in figure 1 wherein said heat sink (22) includes an electrically conductive rigidizer plate and wherein said rigidizer plate is insulated from said circuit board by an electrically insulating thermally conductive adhesive (12).

As to claim 6, PA and Linden discloses a circuit board assembly wherein said vias (Linden 68) includes solder (49-PA) which is utilized to electrically connect said surface mounted device end caps with said pad and wherein said solder flows into said via providing a solid thermal path.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use the thermal vias including solder as taught by PA and Linden in order to make an electrical connection of an IC chip through the circuit board and also reduce a heat dissipate from the chip mounted on the circuit board.

As to claim 7, PA discloses all of the limitations of the claimed invention, except for said via thermally intersects both of said pads.

Linden shows vias (68) thermally intersects both pads.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use vias thermally intersects both pads as taught by Linden to employ the assembly of PA in order to make an electrical connection and also reduce heat from an IC chip mounted on the printed circuit board.

As to claims 8 and 9, PA and Linden disclose all of the limitations of the claimed invention, except said via is fabricated or plated from a material said pad is formed from.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use same material to make a via and pad in order to provide a low cost for manufacture as taught by PA and Linden, since it has been held to be within the general skill of a worker in the art to select a know material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416.

As to claim 10, PA discloses a circuit board assembly (9) as shown in figure 1 comprising:

- a multiple layer printed circuit board (14);

- a surface mounted ceramic device (28) having first and second ends (30, 32)

- with end caps (34, 36);

first and second electrically conductive pads (42) supporting respective said first and second ends of said device above said printed circuit board, said first and second pads being soldered to said first and second end caps; and

a heat sink (10) positioned adjacent said printed circuit board opposite said pads and separated from said printed circuit board by a thermally conductive electrically insulating adhesive (12).

PA does not show a plurality of cylindrical thermal vias deposited in said printed circuit board pads thermally connecting said first and second pads with respective third and fourth pads generally on an opposite side of said circuit board, said third and fourth pads being thermally connected via said adhesive with said heat sink.

Linden shows a plurality of cylindrical thermal vias (68) deposited in a printed circuit board pads (70) thermally connecting said first and second pads with respective third and fourth pads (46) generally on an opposite side of said circuit board, said third and fourth pads being thermally connected via said adhesive (44) with a heat sink (22).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use cylindrical thermal via as taught by Linden to employ the assembly of PA in order to provide an electrical connection and enhance heat removal and allow a device mounted on a printed circuit board being operated a lower temperature.


**Conclusion**

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Miyagi et al., Kresge et al., and Japp et al. disclose related art.
5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tuan T Dinh whose telephone number is 703-306-5856. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David L. Talbott can be reached on 703-305-9883. The fax phone numbers for the organization where this application or proceeding is assigned are 703-305-1341 for regular communications and 703-305-1341 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

TD  
March 13, 2002

  
Kluono  
Primary Examiner